Title: Matrix calculus

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Abstract: This bachelor thesis deals with the exponential and logarithmic map, which are first defined and then their properties are proven. The exponential is considered on operators on Banach spaces in the text and its derivative, the differential equations which it solves and the formulae for the exponential of the sum of operators or the inverse of the exponential of an operator are presented. A logarithm is defined on the space of finite square matrices and its existence and uniqueness are analysed. Further the thesis focuses on the principle branch of the logarithm and properties of this map such as commutativity, properties of spectrum and monotony or the formula for the principle branch of the logarithm of the inverse. The root of a matrix is mentioned in the context of the logarithm.

Keywords: Exponential of an operator, logarithm of a matrix, principle branch of the logarithm